

WHAT IS CLAIMED IS:

✓ 1. An apparatus for plating a substrate by immersing the substrate in baths containing plating solutions, the substrate proceeding along a predetermined process path within the apparatus, and the substrate having a surface with fine pits formed thereon, the apparatus comprising:

a first bath containing a first plating solution and being adapted to form a first plating layer within the fine pits; and

a second bath disposed after the first bath in the process path and containing a second plating solution different from the first plating solution, said second bath being adapted to form a second plating layer on the first plating layer.

2. The apparatus of claim 1, wherein each of the fine pits comprises a barrier layer, and the first bath forms the first plating layer on the barrier layer.

3. The apparatus of claim 1, wherein the second bath forms the second plating layer to substantially fill the fine pits.

✓ 4. The apparatus of claim 1, wherein the first bath is an electroplating bath and forms the first plating layer while supplying an electroplating current.

5. The apparatus of claim 4, wherein each of the pits comprises a barrier layer, and the first bath supplies electroplating current through the barrier layer.

6. The apparatus of claim 1, wherein the second bath is an electroplating bath and forms the first plating layer while supplying an electroplating current through the first layer.

✓ 7. The apparatus of claim 1, wherein the first bath is adapted to provide a plating condition for plating a first layer covering the entire surface within the fine pits.

8. The apparatus of claim 1, wherein the first plating solution has a higher throwing power and a greater ability to adhere to the barrier layer than the second plating solution.

9. The apparatus of claim 8, wherein the second plating has a composition of 100-300 g/l of copper sulfate and 10-100 g/l of sulfuric acid.

10. The apparatus of claim 9, wherein the first plating solution has a composition of 5-100 g/l copper sulfate and 100-250 g/l sulfuric acid.

11. The apparatus of claim 9, wherein the first plating solution comprises a copper pyrophosphate solution.

12. The apparatus of claim 11, wherein the first plating solution is an alkaline plating solution.

13. The apparatus of claim 1, further comprising:

a first washing station between the first plating bath and the second plating bath in the process path;

a second washing station disposed after the second plating bath in the process path; and

a drying station disposed after the second washing station in the process path.

14. The apparatus of claim 13, further comprising:

a first pump in fluid contact with the first plating bath and a source of the first plating solution; and

a second pump in fluid contact with the second plating bath and a source of the second plating solution.

15. The apparatus of claim 13, further comprising:

a preprocessing bath disposed before the first plating bath in the process path and

containing an aqueous sulfuric acid solution; and

a third washing station between the preprocessing bath and the first plating bath in the processing path.

16. An apparatus for plating a substrate comprising:

a plating bath;

a first plating solution supply comprising a first plating solution for supply to said plating bath;

a second plating solution supply comprising a second plating solution different from the first plating solution for supply to said plating bath; and

a switch for switching the supply of said first plating solution from said first plating solution supply and said second plating solution from said second plating solution supply to said plating bath on and off.

17. The apparatus of claim 16, wherein the first plating solution has a higher throwing power and a greater ability to adhere to the barrier layer than the second plating solution.

18. The apparatus of claim 17, wherein the second plating solution has a composition of 100-300 g/l of copper sulfate and 10-100 g/l of sulfuric acid.

19. The apparatus of claim 18, wherein the first plating solution has a composition of 5-100 g/l copper sulfate and 100-250 g/l sulfuric acid.

20. The apparatus of claim 18, wherein the first plating solution comprises copper pyrophosphate solution.

21. The apparatus of claim 20, wherein the first plating solution is an alkaline plating solution.

22. The apparatus of claim 16, wherein the first plating solution is adapted to form a first plating layer within the fine pits; and the second plating solution is adapted to form a second plating layer on the first plating layer.

23. The apparatus of claim 22, wherein each of the fine pits comprises a barrier layer, and the first plating solution forms the first plating layer on the barrier layer.

24. The apparatus of claim 22, wherein the second plating solution forms the second plating layer to substantially fill the fine pits.

25. The apparatus of claim 22, wherein the first plating solution is an electroplating solution and forms the first plating layer while receiving an electroplating current.

26. The apparatus of claim 25, wherein each of the pits comprises a barrier layer, and the first plating solution receives electroplating current through the barrier layer.

27. The apparatus of claim 22, wherein the second plating solution is an electroplating solution and forms the first plating layer while receiving an electroplating current through the first layer.

28. The apparatus of claim 22, wherein the first plating solution is adapted to provide a plating condition for plating a first layer covering the entire surface within the fine pits.

29. The apparatus of claim 16, wherein the plating bath is connected to a wash water supply device.

30. The apparatus of claim 16, wherein the switch comprises a valve.

31. The apparatus of claim 30, wherein the switch comprises a timer for opening and closing the valve.

10017384-121801